



## Novel Nanoliposomes and Their Use for the Treatment of Amyloid Protein Diseases (VA Reference No. 13-055)

*Methods, Compounds, & Compositions for Treatment of Amyloidosis*

### Technology

Treatment of light chain amyloidosis (AL)

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### Stage of Development

Reduced to practice

### Keywords

- Amyloidosis (AL)
- Light chain (LC)
- Nanoliposomes (NL)
- Misfolding diseases

### Patent Status

Provisional filed

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### Technology

Amyloid protein misfolding diseases are associated with vascular injury induced by amyloid proteins. Light chain amyloidosis (AL) is a protein-misfolding disease associated with high morbidity and mortality that involves plasma cell overproduction of amyloidogenic light chain proteins (LC) leading to multiorgan injury, particularly heart failure. This invention relates, in part, to the discovery that soluble/prefibrillar light chain proteins such as LC or A $\beta$  induce microvascular dysfunction in human arterioles. These findings are consistent with clinical observations of endothelial dysfunction in early and established disease.

At the present time, chemotherapy autologous stem cell transplantation to eradicate the plasma cells is the only treatment available but it is associated with high treatment related mortality and cannot be given in many patients with advanced disease. There is no current treatment for Alzheimer's disease and other amyloid protein misfolding disorders. Nanoliposomes (NL) are artificial phospholipid vesicles that bind A $\beta$  proteins (in Alzheimer's disease) pointing to their potential to modify injury by misfolded proteins. We discovered that nanoliposomes attenuate (LC and A $\beta$ )-induced human arteriole endothelial dysfunction and protect against amyloid protein-induced human endothelial cell injury.

### Status

The Department of Veterans Affairs is looking for a partner for further development and commercialization of this technology through a license and the VA inventors are available to collaborate with interested companies through a Cooperative Research and Development Agreement (CRADA).